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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/542,036	04/03/2000	Hans-Ueli Roeck	32558	4899

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EXAMINER

CHAU, COREY P

ART UNIT	PAPER NUMBER
2644	9

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/542,036

Applicant(s)

ROECK, HANS-UELI

Examiner

Corey P Chau

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-32, 47, 54 and 55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-46 and 48-53 is/are allowed.
- 6) ☒ Claim(s) 20, 21, 22, 28, 29, 30, 31, 32, 47, 54, and 55 is/are rejected.
- 7) ☐ Claim(s) 23-27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413):<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____   |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 28 and 47 are objected to because of the following informalities:

On page 14, lines 2-3, "characteristics of said at microphone" should be replaced with "characteristics of said microphone".

On page 18, lines 16, "two sub--arrangements" should be replaced with "two sub-arrangement".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 54 and 55 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.
4. Claim 54 discloses a microphone arrangement implementing the method of Claim 52. This is non-statutory subject matter because the claimed invention is directed to an arrangement and a method, wherein a patent may be obtain when claimed invention is an arrangement or a method.
5. Claim 55 discloses a microphone arrangement implementing the method of Claim 53. This is non-statutory subject matter because the claimed invention is directed to an arrangement and a method, wherein a patent may be obtain when claimed invention is an arrangement or a method.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 20, 21, 22, 28, 29, 30, 31, 32, and 47 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5473701 to Cezanne et al. (hereafter as Cezanne).

8. Regarding Claim 20, Cezanne discloses a method of enhancing the signal-to-noise ratio of a microphone array, which converts an acoustical input signal impinging on a microphone arrangement ( $c_B(n), c_F(n)$ ) into an electric output signal as a function of the angle at which the acoustical input signals impinge on the microphone arrangement (equations (1) and (2)), the method comprising the steps of:

providing at said microphone arrangement a first microphone sub-arrangement ( $c_F(n)$ ) and a second microphone sub-arrangement ( $c_B(n)$ ), each microphone sub-arrangement having a transfer function characteristic which converts said acoustical input signal impinging on said microphone sub-arrangements into an electrical output signal of the respective sub-arrangement, said transfer characteristic of said first microphone sub-arrangement being different from said transfer characteristic of said second microphone sub-arrangement with respect to said acoustical input signal (equations (1) and (2));

forming a ratio of said output signals of said first and second microphone sub-arrangements, thereby generating a ratio result (i.e. plurality of cardioid sensors comprises a foreground cardioid sensor and a background cardioid sensor and wherein step of evaluating comprises determining a parameter reflecting a ratio of (i) a product of output signals of the foreground and background cardioid sensor to (ii) the square of the output signal of the background cardioid sensor.  $(c_F(n) c_B(n)) / c_B(n)^2$ , the  $c_B(n)$  would cancel out and form the equation  $(c_F(n) / c_B(n))$ , therefore a ratio of the first and second microphone sub-arrangement) (claim 8);

forming a saturated product with said ratio result as one factor, thereby clipping said product at a predetermined or predeterminable value and generating a saturated product result;

generating said electric output signal as a function of said saturated product result.

9. Regarding Claim 21, Cezanne discloses the steps of saturating said product on a maximum value.

10. Regarding Claim 22, Cezanne discloses the step of forming said saturated product with a second factor having an arbitrary value different from 0 (equation 5).

11. Regarding Claim 28, Cezanne discloses a  $\beta$  processor for determining the scale factor  $\beta$  used in adjusting the directivity pattern of the array (i.e. selecting said transfer characteristics of said microphone sub-arrangements to have respectively a maximum gain for acoustical signal impinging on substantially opposite directions) (column 5, lines 35-38).

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12. Regarding Claim 29, Cezanne discloses a microphone array formed from back-to-back sensor (i.e. microphone sub-arrangement to be generally of cardioid shape in polar diagram representation) (column 4, lines 37-42).

13. Regarding Claim 30, Cezanne discloses back-to-back cardioid sensors, however other array configuration in accordance with the invention is possible (column 9, lines 38-40). Therefore it would have been obvious to one of ordinary skill in the art to seek known sensor configurations. Iwahara for example discloses directivity pattern as described by a cardioid or hypercardioid curve. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any known sensor configurations, as taught by Iwahara. Therefore it would have been obvious to modify the microphone array of Cezanne with the teaching of Iwahara to utilize a hypercardioid shape.

14. Regarding Claim 31, Cezanne discloses establishing a desired transfer characteristic of a hearing device (column 1, lines 10-18).

15. Regarding Claim 32, Cezanne discloses directional microphone array have been used to combat the problems of noise. Therefore, it would have been obvious to use such a system for hearing aids, which are susceptible to noise, in order to combat the problem of noise in hearing aids.

16. Claim 47 is essentially similar to Claim 20 and is rejected for the reasons stated above apropos of Claim 20.

***Response to Amendment***

17. In regards to Claim 3-8, and 11-18, on page 23, paragraph 6, applicant "disputes that the claims originally filed were improper". For example, claim 3 recited the "method as claimed in either of claims 1 and 2...". This is not a proper alternative language, claim 3 should have be written as "method as claimed in either of claims 1 or 2..." for it to be proper alternative language. Therefore claim 3 was objected under 37 CFR 1.75(c) as being improper form because a multiple dependent claim should refer to other claims in the alternative only. Claims 4-8 was objected to because it depended on an objected claim. Claims 4-8 is in proper alternative language, however claims 4-8 would have been objected to under 37 CFR 1.75(c) as being in improper form because multiple dependent claim cannot depend from any other multiple dependent claim. Claim 3 is a multiple dependent claim; therefore it is improper for claims 4-8 to depend on Claim 3. The reasons stated above apropos to claims 3-8 applies to claims 11-18. Therefore, claims 3-8 and 11-18 were not further treated on the merits.

***Allowable Subject Matter***

18. Claims 23-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

19. Claims 33-46 and 48-53 are allowed.

20. The following is an examiner's statement of reasons for allowance:

21. Regarding Claim 33, none of the prior art teaches a computing unit including:

a ratio forming and weighting unit having an output a denominator input, a numerator input and a weighting input, wherein

one of said inputs of said computing unit is operationally connected to said denominator input, and wherein

the other of said inputs of said computing unit is operationally connected with said numerator input.

22. Claims 34-46 are allowable due to dependence from Claim 33.

23. Regarding Claim 48, none of the prior art teaches a computing unit that generates a ratio signal that is proportional to an amplitude or an absolute value of one of said first and second frequency domain signals, and further wherein,

said ratio signal is inversely proportional to an amplitude or an absolute value of the other of said first and second frequency domain signals, and still further wherein

said ratio forming and weighting unit multiplies said ratio signal by a non-zero value to create a weighted ratio.

24. Claims 49-51 are allowable due to dependence from Claim 48.

25. Regarding Claim 52, none of the prior art teaches generating an electrical output signal according to the equation:

$$S = c_n \{ A - [\alpha (|c_z| / |c_n|)] \}_{satB}$$

26. Claim 53 is allowable due to dependence from Claim 52.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably



accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

27. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

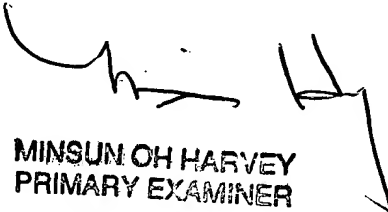
28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Corey P Chau whose telephone number is (703)305-0683. The examiner can normally be reached on Monday - Friday 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 19, 2004



MINSUN OH HARVEY  
PRIMARY EXAMINER